

Resistance, energy and power

Circuits, potential difference and EMF

Learning
objectives**MUST (C)**

Be able to recognise and draw circuit symbols for common electrical components.

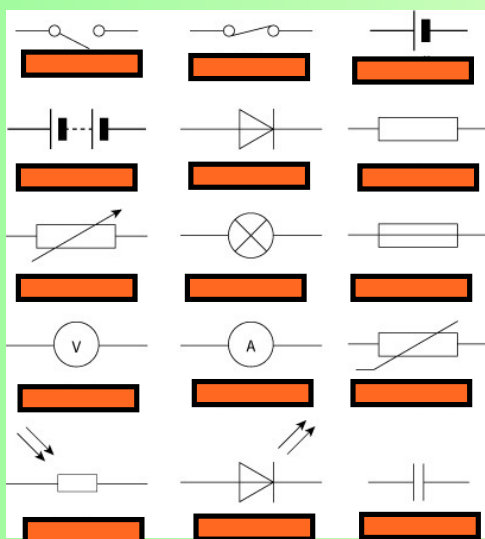
SHOULD (B)

Understand potential difference and electromotive force, and the difference between them

COULD (A/A*)

Select and apply equations to calculate energy transfer

STARTER: How many of these circuit symbols can you identify? Recall as much as you can about them.



which is
more
useful?

LED and
LDR

Resistance, energy and power

Circuits, potential difference and EMF

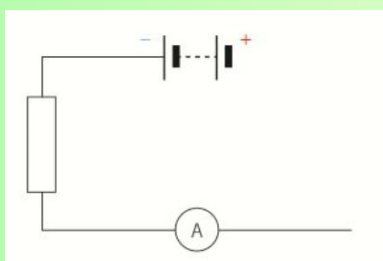
MUST (C)

Be able to recognise and draw circuit symbols for common electrical components.

Rules for drawing circuit diagrams:

- 1) Only use the circuit symbols from the previous slide
- 2) Do not leave any gaps between the wires
- 3) Where possible, use pencil and ruler to draw straight lines. However, carefully drawn free hand lines will be acceptable in assessments.

What errors could there be in drawing circuits?



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SHOULD (B)

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Potential difference (voltage)

What's your existing knowledge?

In a model of a circuit, what would represent voltage?

Potential difference and volts

Potential difference is measured in volts. One volt is 1 JC^{-1} . (which is another way of writing 1 J/C or 1 joule per coulomb). Write this key definition:

A volt is the potential difference across a component when 1 J of energy is transferred per coulomb of charge passing through that component

What does this mean?

Can we recall the meaning of one coulomb?

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COULD (A/A*)

Select and apply equations to calculate energy transfer

Potential difference equation:

$$V = \frac{W}{Q}$$

V = potential difference (volts)

W = energy transferred (J)

Q = charge (C)



Electromotive force equation:

$$\varepsilon = \frac{W}{Q}$$

 ε = electromotive force (volts)

W = energy transferred (J)

Q = charge (C)

- a) What is the potential difference across a lamp if 12J of energy is transferred when 3C of charge passes through it?
- b) Another lamp has a potential difference of 5V across it. 4C of charge passes through it. How much energy is transferred?
- c) How much energy is transferred when 3C of charge passes through a cell with an emf of 9V?
- d) What is the emf of a battery if 48J is transferred to 3C of charge that passes through it?

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Learning objectives	MUST (C)	Be able to recognise and draw circuit symbols for common electrical components.
	SHOULD (B)	Understand potential difference and electromotive force, and the difference between them
	COULD (A/A*)	Select and apply equations to calculate energy transfer
<p>PLENARY: Name that component!</p> <p>Charge carriers pass through a number of components; in each case there is an energy transfer. Tell me: does this component have a pd across it or provide an emf? What could it be?</p> <ol style="list-style-type: none"> 1) Electrical to light 2) Light to electrical 3) Kinetic to electrical 4) Electrical to heat 		

